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THE FOCAL SPOT

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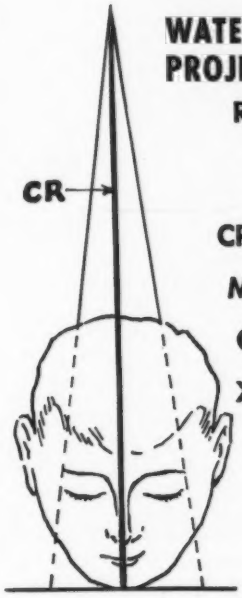

R Radiographic Base Line. Extends from external acoustic meatus to the outer canthus of the eye.

CR Central ray projection.

M External acoustic meatus.

C Outer canthus of eye.

X Root of nose.

The head of the patient is arranged in the nose-chin position with the chin resting on the cassette, tunnel or table top. Tilt the head so that the radiographic base line makes an angle of 35° to 37° with the plane of film. The head must be immobilized and properly centered with its median plane perpendicular to the film.

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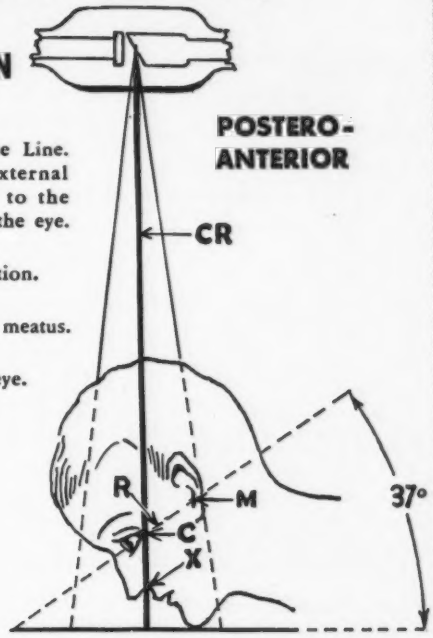

Central radiation enters the vertex of head and projects perpendicularly to the film through the root of nose, which is placed over the center of film or field to be exposed. In this position, the petrous portion of the temporal bones are projected below the field of the maxillary sinus.

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Montreal Makes Plans for Third Dominion Convention

At a meeting held on December 2nd, Convention plans were discussed at length and Committees appointed as tabled below. The Convention dates are May 31st, June 1st and 2nd (Thursday to Saturday). The Windsor Hotel will be Convention Headquarters and is ideally situated and well equipped for this purpose. Watch this space in our next issue for further particulars.

The following Committees have been appointed:

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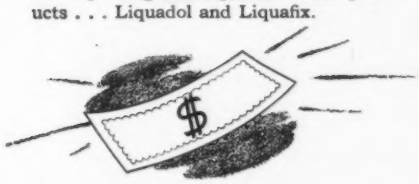

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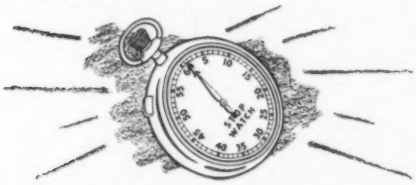

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PRACTICAL FRATERNALISM

Here is an easy way to do a lot of good and incidentally to get better acquainted with one another. During Active Service Training many young men and women are stationed far afield; often it is the first time they have been away from home. After living in barracks for weeks on end they thoroughly appreciate getting back into home surroundings for an evening, a Sunday or a "48".

In the words of Mr. H. M. Welch of Calgary, who made this suggestion and who, incidentally, has been putting his precepts into practice for some time past: "There must be a number of sons and daughters of members of our Society scattered across Canada who would possibly like to make contact with some of us."

Contacts such as this have already been made by a few members on their own initiative and have proved very beneficial to all concerned. So we suggest that, if you or your relatives are training away from home, you get in touch with the President or Secretary of the province in which you are stationed. To the officers of the societies we suggest that you find those of your members who are able to extend hospitality. And to the members we suggest that you do not wait to be asked but let your President or Secretary know that you will welcome the opportunity to offer the comforts of home to those who are away from their own homes.

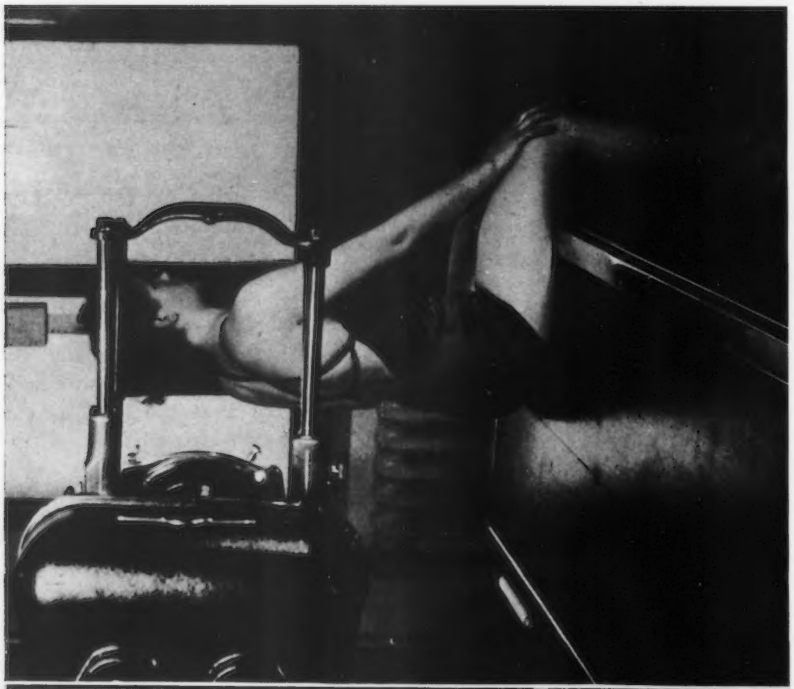

Figure 2

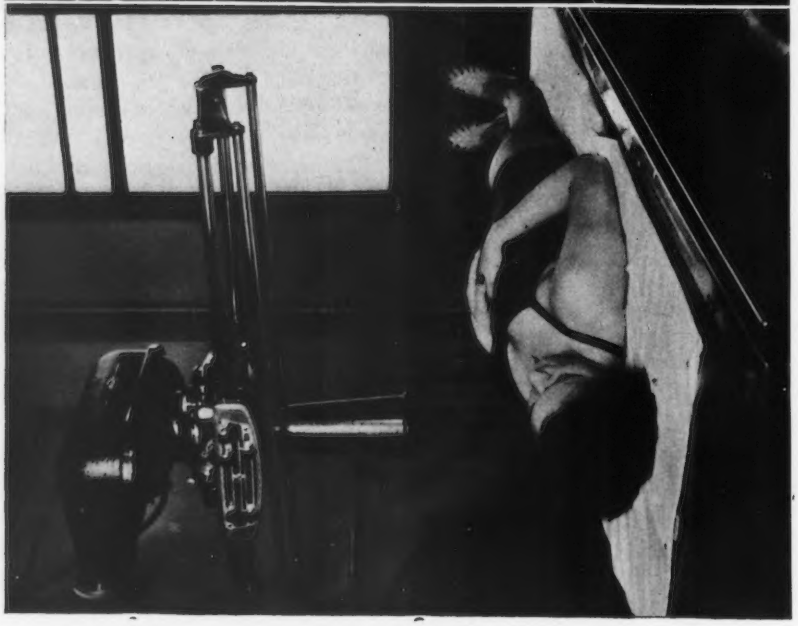

Figure 1

Technique for Oblique Radiography of the Spine

By EDWARD F. GUNSON, R.T.
Strong Memorial Hospital, Rochester, New York

During the past few years there has been an increasing demand from the Radiologists and Orthopedists for Oblique views of the Spine. This paper has to deal with the techniques especially adapted for a more detailed study of the spine in the oblique projection.

One finds reference to this in European literature under the name of the "Dittman Position," also the work of Myer-Burgdorff and Lange did much to demonstrate the value of this technique.

In this country, Hubeny was perhaps the first to call attention to the value of oblique views, Ghromley and Kirklin and Hadley and others have described the technique, and have demonstrated its worth. I propose to discuss and demonstrate oblique techniques as used in our Clinic.

Occipito-Cervical Articulation (oblique)

The patient is placed on the table in the supine position, with the cervical spine in the exact centre of the Bucky diaphragm. (Fig. 1). The patient's head is placed so that the base-line is at right-angles to the film. The central ray is projected between the orbits, the head of the patient is then rotated until the central ray is over the right and left orbit in turn, making an exposeure in each position for comparison. The occipito-cervical articulations are well demonstrated and, in addition, the odontoid process is depicted clearly.

Cervical Intervertebral Foramina (oblique)

Anatomy: The foramina are bounded above and below by the concave borders of the pedicles of the super-adjacent and sub-adjacent vertebrae, respectively. The posterior, by the anterior aspect of the articular processes, and anteriorly, by the latero-posterior aspect of the adjacent vertebral bodies. Note that the joint capsule posterior and disc space anterior take part in these boundaries. The intervertebral foramina vary slightly in size, and are directed downward and antero-laterally. They serve as outlets for the spinal nerves and blood vessels.

Technique:

Roentgenologically the cervical intervertebral foramina are visible in the oblique 45° technique. The patient is standing or sitting upright facing a cassette changer. (Fig. 2). An 8 x 10 cassette is vertical and its cephalic edge is about 1" above the level of the inion. The patient is rotated so that the transverse plane of the shoulder and the sagittal plane of the skull are each 45° to the plane of the film. The spine should be erect. The chin is elevated so that the occlusal plane of the maxillary teeth is horizontal. The paitent's head is immobilized to prevent movement.

The central ray is projected perpendicular to the plane of the film, and at a caudal angle of 10°, so that it will

pass through the fourth cervical vertebrae to the centre of the film. Both the right and left foramina should always be examined. If the correct technique has been employed it will reveal all of the foramina.

Despite the general advancement in x-ray technique, most technicians feel a little lowering of morale when asked to radiograph the first and second thoracic spine. However this can be somewhat simplified by having the patient lie on the table in a true lateral position, with the upper thoracic spine in the exact centre of the Bucky diaphragm. If the patient is lying on the right side, the right arm is drawn forward and is flexed at right angles so that the palm of the hand is resting on the head. A sandbag is placed under the patient's head so that the cervical spine is at the same level as the thoracic spine. The body is rotated posteriorly about 5°. In other words instead of 90° angle the patient is lying at an 85° degree angle. The left arm is placed posteriorly, so that the hand is resting on a sandbag. The central ray is projected vertically through the first, second, and third thoracic vertebrae. This procedure projects the bodies at a slight angle from the usual true lateral view. However it does demonstrate the upper thoracic region.

Thoracic Intervertebral Articulations (oblique)

recently described by Fuchs.

Anatomy:

A knowledge of the anatomy of the latero-posterior structures of the thoracic vertebral bodies is essential to an understanding of the technique proposed for the oblique projection. The intervertebral articulations are formed by the superior and inferior facets of the superior and inferior articular processes respectively. The articular facets are flat and slender, the superior facets of one vertebra face the inferior of the superadjacent vertebra, and their surfaces glide over each other in movement. The plane of an articular facet is essentially longitudinal; the superior facets face postero-laterally and the inferior, antero-medially.

Technique:

For this technique, the patient is placed on the table, in a position ordinarily employed for a lateral view of the spine. The thoracic spine is centred over the Potter-Bucky diaphragm. The lower-most shoulder is drawn forward, so that the arm is flexed at right angles, and abducted so that the forearm lies in front of the face and the palm of the hand is up. (Fig. 3). When this position has been assumed the body is rotated posteriorly, until the median plane forms an angle of 15° with the plane of the film. The procedure is faciliated by using a triangle of 75°. The hypotenuse of the triangle is placed opposite the back muscles of the upper, mid and lower thorax; then the body is slowly and carefully rotated posteriorly until the muscles just touch this edge. The upper arm is moved backward to lie alongside the body; with the hand supported by a sandbag. This will help immobilize the patient. The central ray is perpendicular to the plane of the film, through the mid-thoracic region. This technique can be applied in the erect position and radiographs made with this technique will demonstrate the intervertebral articulations.

Figure 3

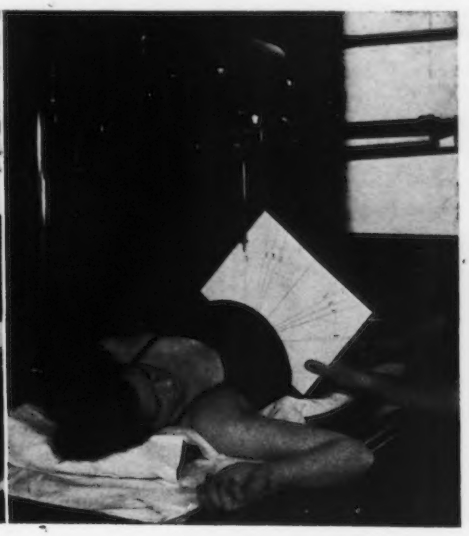

Figure 4

Lumbar Articulations or Facets (oblique)

Anatomy:

The lumbar vertebrae are the largest segments of the vertebral column. The body is large, wider from side to side than from before backward, and a little thicker in anterior than posterior portion. It is flattened or slightly concave above and below, concave posteriorly and deeply constricted in front and at the sides. The pedicles are very strong, directed backward from the upper part of the body; consequently, the inferior vertebral notches are of considerable depth. The superior and inferior articular processes are well defined, projecting respectively upward and downward from the junctions of pedicles and laminae. The facets of the superior processes are concave, and look backward and medialward; those of the inferior are concave, and are directed forward and lateralward. The former are wider apart than the latter, since in the articulated column the inferior articular processes are embraced by the superior processes of the subadjacent vertebrae.

Technique:

The technique for securing satisfactory oblique views of the lumbar spine is not difficult, though sometimes, some ingenuity will be needed to properly show some of the lumbar articulations, whose abnormal rotation is evidenced.

The patient is placed on the table for the routine anterior-posterior position. From the supine position the patient is rotated until the antero-posterior axis of the lumbar spine is at an angle of 45°. (Figs. 4 and 5). To accomplish this technique, make a cardboard cut to the curve of the anterior aspect of the trunk at the level of the anterior superior iliac spines. On the cardboard lines are drawn radially from the concave lower edge and marking an angle of 45° with the vertical. The tips of the concave edge are ap-

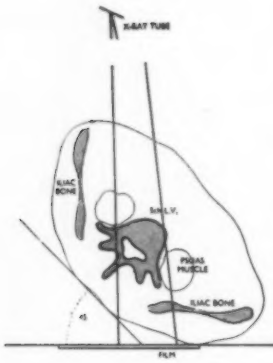

Figure 5

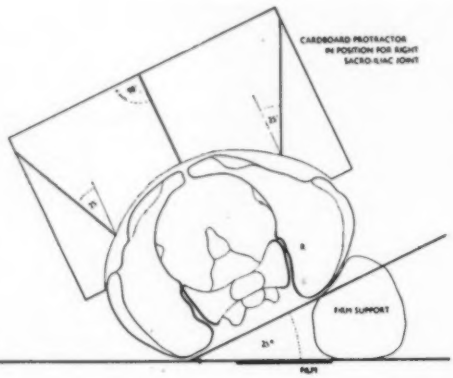

Figure 6

plied to the iliac spines, and the patient is rotated toward the side to be radiographed until the angle 45° line is perpendicular.

If the right facets are being examined, the left side of the patient is raised. The hand of the raised side grasps the edge of the table and thus steadies the upper part of the body; the lower part of the body is maintained in an oblique projection, by sandbags placed at the lower thoracic and sacral region. The long axis of the spine is centred on the table so that the spinous processes are in the midline of the Bucky diaphragm. The central ray is perpendicular and through the third lumbar vertebrae. The exposure will be about twice that given for the usual A. P. projection. This view shows the actual articulations between the articular processes of the vertebrae, and the vertebral bodies from the oblique aspect.

Oblique views of the lumbo-sacral region, especially the facets of the fifth lumbar vertebrae, are frequently seen at abnormal angles to show this area.

The patient is placed in the same position, as for the oblique views of the lumbar region. There is only one difference — the patient is rotated to an angle of 30° instead of 45°. The cardboard protractor is again used to accomplish this technique, and the patient is immobilized by the hand of the raised side grasping the edge of the table and thus steadying the upper part; the lower part of the body is maintained in an oblique projection by sandbags placed at the lower thoracic region and lumbar region. The long axis of the spine is centred on the table so that the spinous process of the fifth lumbar vertebrae is in the midline of the Bucky diaphragm. The central ray is projected perpendicularly and three inches forward from the posterior aspect of the trunk, at the level of the anterior superior iliac spines.

Oblique Sacro-Iliac Joints.

The patient is on the table in a supine position. The cardboard protractor is again used. (Fig. 6). The patient is rotated until the antero-posterior axis of the pelvis is at an angle of 25 to 30 degrees to the horizontal and the pelvis supported with sandbags under the trunk and thigh. The central ray is

projected perpendicularly and one inch medially, to the anterior superior iliac spines on the raised side, and directly through the joint. Both the right and left sacro-iliac joints are taken for comparison.

Finally, in order to depict with greater clarity both of the sacro-iliac joints on the same film, the patient is in the same position as for the routine examination of the pelvis, with the crest of the ilium in the centre of the film. The central ray is directed cephalad 35 to 45 degrees, and is centred just above the upper border of the symphsis pubis and emerges at the sacral foramina and the fifth lumbar vertebrae.

The exact measurement of this lumbo-sacral angle is obtained from a true lateral view of the area, and after this radiograph has been made and developed, the exact angle can then be measured. One will find that this angle varies from 35° to 45°. Therefore one can see that this area does not lend itself so easily to roentgenography, as do other parts of the body.

Conclusion:

In order to properly visualize certain areas of the cervical, thoracic and lumbar spine, oblique radiographs are necessary. We have found the cardboard protractor and triangles of great help in reaching the proper angle. Variation in angle of facets occur; for these the proper angle must be estimated. Repeats may be necessary where angles of facts deviate. All of these views are difficult to obtain; however they have some value to the Radiologist. We have frequent requests for this type of view to elaborate some finding in the routine views.

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Duplication of Chest Technique for Serial Study

Using a Penetrometer

By J. A. RICCIATTI
Kirkland Lake, Ont.

In taking single chest films it is necessary first of all to obtain a diagnostic film. It is recognized that a film may have a latitude of 14 kv. and still be considered within diagnostic limits. That will allow a possible total technique variation equivalent to 7 kv. on either side of the preferred technique. With accurate controls available on modern machines and ordinary care and judgment, a standardized technique may be used so that all finished radiographs will fall within the 14 kv. limit. Further, experience teaches a technician to sum up the patient's physical qualities, varying machine or power changes and to compensate so that a large percentage of his films will be within a much narrower range. However, in spite of all care, it has been found that as much as 10 kv. from the expected may result, due to cumulative errors.

The above requirements for single films apply also to initial films eventually used for serial study. But what is more difficult and of great importance in this field is the need for repeat films of comparable qualities. For the proper study of lesion changes, as well as noting pleural effusion, it is essential that the original technique be closely duplicated, preferably within a 2 kv. limit. That will allow only a 1 kv. leeway on either side of expected result.

It can be stated therefore that all chest films taken should be within diagnostic limits, but only a small percentage of these will be found lying within the tolerance of 2 kv. needed for serial study. A more accurate controlled technique would be indicated for successful duplication of chest films.

The greatest difficulty in duplication of techniques lies in factor changes beyond the control of the operator. These include gradual normal wear of equipment and materials, resistance changes, and possible input power variations beyond automatic control. Any and all these variations can be discovered and compensated for with the aid of a penetrometer image on all radiographs and a record of technique used on all files. This must be supplemented by a standard strip which covers your entire range of satisfactory techniques. The ideal penetrometer placed permanently on your cassette changer should have at least 5 steps and be masked with lead so that it presents a clear space on either side of the image for purposes of comparison, as shown in Fig. 1. A narrow ¼ inch penetrometer is suitable, with ¼ inch border, requiring a total space of ¾ of one inch in width.

The ¼ inch border top and bottom coupled with the spacing between strips on the standard penetrometer film (Fig. II) allows for the superimposition of the standard penetrometer film over the penetrometer image on the radiograph, thus enabling three strips to be viewed at once for accurate comparison.

A copper tablet made up of layers of copper foil is preferable to the aluminum type in that it will be much thinner and less likely to interfere with the

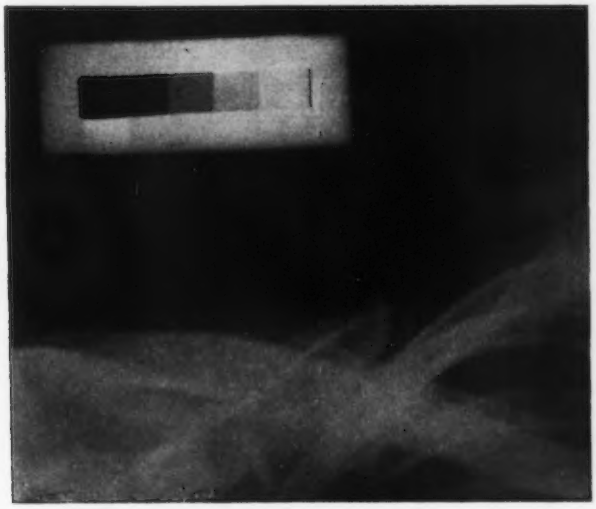

Figure 1

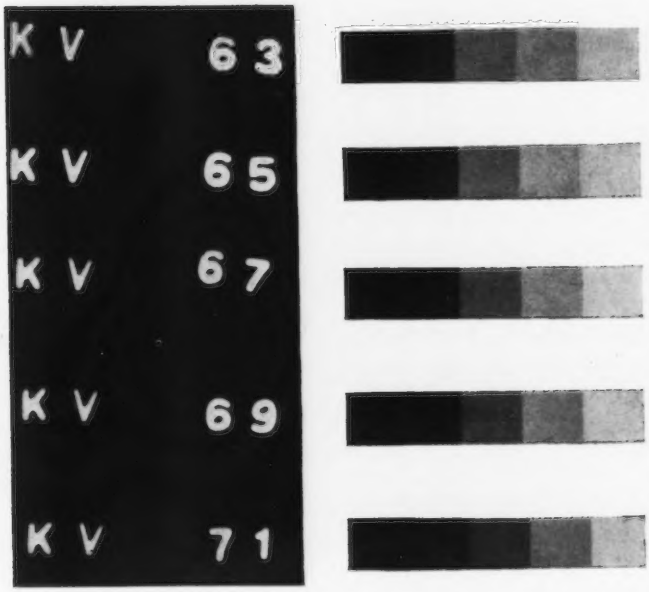

Fig. 2 shows part of the entire range.

patient, having a smaller projection from the face of the cassette changer.

Once a technique for routine use has been found satisfactory, standard strips of the penetrometer are made covering the entire range at 2 kv. intervals. Precaution must be taken to keep all factors constant as to time and milliamperage, while varying the kilovoltage in 2 kv. steps. These must be developed with extra care as to time, temperature and agitation. Reference to these strips is then made daily. Comparison of standard with penetrometer image on your chest radiographs will show the departure from expected result within one kv. Compensation as indicated can then be made on factor settings to continue obtaining uniform comparable films.

In practical use the standard strips are kept in a convenient place where they can be called upon at any time for comparison. Comparison with any 2 or 3 films taken from the daily batch is sufficient as a guide and gives the desired information. The penetrometer images on these radiographs are compared with the corresponding penetrometer images on the standard strips. If they are identical, that is sufficient evidence that no factor changes have taken place, and the same factor settings should be maintained. In the event that a change is indicated (which may be expected in time) a corresponding compensating change in your technique settings should be made. It can be noted also, whether the change be in density or contrast and to what extent, so that exact technique alterations can be made. For example, if image on a film where factors used were 63 kv. at 10 mas. compares favourably both in density and contrast with standard image 61 kv. at 10 mas. a total technique change of 2 kv. is indicated. It is understood that development and all other factors must be duplicated at all times. Where the difference is in contrast rather than density, with the centre steps in the penetrometer comparing but not those at either end, a change in milliamperage has taken place and should be compensated. This continual altering of technique settings will compensate for changes which take place in all machines and is essential to continue obtaining films of comparable qualities. The original standard strips can be kept indefinitely and need not be replaced unless they be broken. For that reason it is best to make several identical strips when making the originals.

Although changes over long periods of time are considerable, overnight changes are rarely, if ever, in excess of a 1 kv. equivalent. With the use of the above method of controlling technique a laboratory can be certain of comparable films for serial study within the 2 kv. tolerance.

A penetrometer image on all your chest films has a practical use in determining whether a series of films are comparable as to technique. Faults in apparent differences may lie in the patient rather than in technical factors and these cannot be distinguished by visual examination of chest films alone. Lesion changes can thus be accurately interpreted. Study of ladder images makes it possible to see whether the variations are in contrast or density or both and to discover underlying causes.

Change in density is indicated where there is a change in total technique, usually caused by over or under exposure, by different screens, or rapid

line fluctuation after machine has been set. Contrast differences can be noticed if images match at one end but not at the other end. There is an increase in contrast if the high density end is darker and a decrease in contrast if the low density end is darker. Changes here are generally due to over or under development, error in development, error in developer temperature or difference in agitation. Changes in both density and contrast may be evident and caused by both exposure and processing errors.

Factors which are within the control of the operator can be duplicated and diligent care must be used for best results. Variations may be found to follow a daily cycle, due to temperature change without proper compensation; a batch cycle where films are lighter with exhaustion of developer when development time compensation is not sufficient; a hypo cycle where films have density loss and increased contrast when hypo is fresh. Bleaching results when films are left too long in the fixing bath.

Other primary factors to be considered are materials, equipment and processing. These come within the control of the operator, and the effect is on sharpness, density and contrast. Sharpness, determined by material and equipment used, as well as relative distance relations are all constants and present no duplication difficulties, leaving density and contrast as variable factors to be contended with.

The source of most common error is in processing, where there exist three possible variables, any of which may account for a difference in total technique equivalent to 2 kv. Time and temperature, exhaustion of solutions and amount of agitation. Care in processing will eliminate these variables.

1. The length of development time for all films should be within 30 seconds, preferably within 15 seconds.
2. Temperature control should be within 1 degree. Time correction should be made for greater discrepancies. Exhaustion changes of the developer should be compensated by development time accurate to within 30 seconds and discarded before exhaustion will cause contrast changes.
3. Films should be placed all heads up or all heads down.

Physical changes in the patient between films must be taken into consideration. Changes in weight within 15 pounds will not materially effect your end result; anything above that limit will require compensation.

A carefully controlled technique will assure chest radiographs of comparable qualities for serial study. Varying factors within the operator's control must be closely duplicated. Those beyond his control and that of the machine must be compensated for and these can best be discovered and remedied with the aid of the penetrometer.

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American Journal of Radiology, August, 1943.

A Short Study in Knee Radiography

By J. F. NEALE
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A surgeon who had spent a number of years in London and Paris studying surgery, partly dissected a knee in my presence and said "Do you know that the knee is the most interesting part of the human body and one of the most intricate parts on which to perform a surgical operation?"

I suggest that this being the case in surgery, it therefore follows that we as radiographers must strive always to place before our radiologists, radiographs of the technical qualities they desire. Some radiologists require Bucky radiographs of the knee, others non-Bucky. Some like more contrast than others, but all require true positioning. This, I submit, is the most important of all points to remember and in so doing, we shall best serve radiologist, surgeon and patient.

Most of the books on positioning just mention placing the patient in the prone position for the P.A. view, supine for the A.P., and on the side for the lateral, plus the additional view for the patella. This, I think, is very incomplete, especially for a junior radiographer. We must endeavour to show all joints clearly, also the tibial spine and patella. One of the easiest things in positioning is to create one wrong in attempting to right another. I find that the angulation of the tube enables me to obtain the best results in each case.

P.A. View

(which will include the patella)

The tube is angled approximately 6° towards the patient's foot, central ray passing through intercondyle joint. The patient's toes are placed over the end of the table, with pad under the superior part of the ankle and foot for comfort. Sand bags are used for immobilization. Technique in this case is 50 PKV, 100 MA, 80 MA secs., 36" distance with Bucky.

A.P. View

I find that in most cases the patient has trouble in straightening his leg enough to give a clear view of the intercondylar joint and notch, so I therefore angle the tube approximately 15° toward the patient's head and rotate leg about 10° medially. This helps to centre the patella. The only variation in technique from the P.A. view is an increase of 3 PKV., this to compensate for the distance between the knee and table top, which is not present in the P.A. view.

Lateral View

Rather than bolster the lower legs, I prefer to angle the tube about 10° toward the patient's head. About an inch of packing is placed under patient's heel and knee is flexed to approximately 30°. The result shows femoral tuberosities superimposed, a

view of the tibio-fibular articulation and clear view of tibial spine and intercondylar joint. Technique is 48 KPV., 100 MA., 80 MAS., at 36" with Bucky.

Tangential View of the Patella

Patient is placed in a prone position with foot drawn toward his head, so that lower leg and femur are angled at approximately 90°. Tube is centred to tuberosities (of femur), angulation being approximately 12° toward patient's head. Technique: 50 PKV., 100 MA., 95 MAS., 36" with Bucky.

Oblique P.A. Views

Patient is in prone position, the toes are brought to touch the opposite leg, injured leg being rotated. This gives us the right-oblique and the left-oblique is obtained by rotating lower leg the opposite way; that is, bring the heel of the injured leg in contact with the uninjured. Technique used as for P.A. view less 3 PKV.

Horizontal Lateral View

This is required by many radiologists to-day and in some hospitals has become routine. It is obtained without causing patient discomfort. In the case of painful injury, film is placed laterally to injured knee, uninjured knee is flexed so that x-rays pass between it and table top or stretcher, patient being in the supine position. Technique: 48 PKV., 100 MA., 8 MAS., 36" distance, non-Bucky. In changing from Bucky to non-Bucky technique the only factor changed was time, which was reduced from 80 MAS., to 8 MAS.

I prefer not to emphasize technique used because almost all x-ray machines call for something different. The point which I have endeavoured to put forward is the importance of true positioning.

Notice Re. Employment

The Secretary's office is being deluged with requests for fully trained x-ray technicians.

There are positions vacant at present in both large and small hospitals, situated in cities and towns.

Will anyone interested please write to the Secretary, stating training and experience, also type of position desired.

Applications have also been received for holiday help during the months of June, July, August and September. Would anyone interested in supply work during that period kindly notify the Secretary.

MARY F. CAMERON, Secretary,
Canadian Society of Radiological Technicians,
250 Main St. E., Hamilton, Ont.

Cassettes and Screens as Variable Factors*

By P. E. HUNT

Saskatoon, Saskatchewan

For the purposes of this study all cassettes used for routine chest films were marked with adhesive tape — the numbering bore no relation to manufacturer, type, date of purchase, or length of service.

Reasonable care was taken to ensure that all films were correctly exposed and processed so that the results would be as close as possible to our conception of optimum density. The examination of the finished films was so arranged that entries of faulty exposure against the cassette involved were without prejudice.

A study of the results after about 200 exposures was not very flattering to us! Only 60% of the exposures were considered optimum. It must be remembered that we were being extremely critical. It is quite safe to say that all films had good diagnostic quality, but even slight evidences of faulty exposure were sufficient to prevent the entry of a film into the optimum group.

Table 1 "A" shows the figures and percentages of 213 exposures.

TABLE 1 "A"

Cassette	Exposures	Underexposed	Optimum	Overexposed
1	34	4 11%	23 67%	7 20%
2	37	1 3%	24 64%	12 32%
3	34	9 26%	17 50%	8 23%
4	34	4 12%	17 50%	13 38%
5	37	6 16%	20 54%	11 29%
6	37	6 16%	28 75%	3 8%
Total	213	30 14%	129 60%	54 25%

The general picture is one of overexposure. A re-arrangement of figures as in Table I "B" where only percentages are shown, indicated that cassettes number 2 and 4 were the greatest offenders in this regard.

TABLE 1 "B"

Cassette	Exposures	Underexposed	Optimum	Overexposed
6	37	16%	75%	8%
1	34	11%	67%	20%
2	37	3%	64%	32% *
5	37	16%	54%	29%
4	34	12%	50%	38% *
3	34	26%	50%	23%

*A report on an investigation arising out of our attempt to standardize Chest Technique.

See Vol. 1, No. 4, The Focal Spot.

Cassettes number 2 and 4 were therefore corrected by using one button less on the auto-transformer. Cassette number 3 was corrected by using one button more — on our particular control stand, one button represents a difference of about 1.5 kilovolts. Cassettes number 5 and 6 were replaced because of poor contact and many artefacts. This, in spite of the fact that as far as optimum density is concerned, number 6 made the best show.

When these cassettes were returned a new series was begun, with greater stress being placed on the need for taking into consideration the patient factor. It was obvious that not all the variations evident in Table I could be blamed on the cassette. It was felt that a larger percenage of films would acquire optimum density if more attention were paid to the tall and slender, the short and stout, the aged, etc., and due allowances made for them.

Table 2 "A" shows the result of about 350 exposures made since that time.

TABLE 2 "A"

Cassette	Exposures	Under-exposed	Optimum	Over-exposed
1	75	2	56	17
		2%	74%	33%
2	51	4	41	6
		7%	80%	11%
3	60	3	42	15
		5%	70%	25%
4	44	5	34	5
		11%	77%	11%
5	65	3	58	4
		4%	89%	6%
6	53	7	43	3
		13%	81%	5%
Total	348	24	274	50
		7%	78%	14%

The picture is still one of a tendency toward over-exposure and a re-arrangement of these figures according to the "stability" of the cassettes points to cassettes 1 and 3 as the chief offenders.

TABLE 2 "B"

Cassette	Exposures	Under-exposed	Optimum	Over-exposed
5	65	4%	89%	6%
6	53	13%	81%	5%
2	51	7%	80%	11%
4	44	11%	77%	11%
1	75	2%	74%	22% *
3	60	5%	70%	25% *
	348	7%	78%	14%

It surely cannot be a coincidence that the newly mounted cassettes (5 and 6) head the list with 89% and 81% respectively. There has been some improvement in the "over all" picture. The percentage of films having optimum density has increased from 60% to 78%.

As I see it at this point there should be a possibility of increasing this still further, say to 85% or 90%.

Cassettes 1 and 3 have now been corrected to bring them more in line with the others. We are also becoming more and more conscious of the necessity of keeping power and processing factors under careful control. In view of all the variables involved in radiography however, I doubt whether progression beyond 90% optimum is feasible, at least with our present equipment.

Big Jobs for Little Electrons*

By A. S. R. RUTHEN
St. John, N.B.

It is frequently said that the more a man learns the more he is conscious of his ignorance. The paradox is explained, of course, by the fact that learning broadens the horizon.

In no field of applied science is this more true than in the study and application of Electronics. Even those of us who have grown up with it, find it extremely difficult, if not impossible, to keep pace with the far-reaching developments of the past few years.

In 1883, Thomas Edison, when experimenting with incandescent lamps, unconsciously opened the door to a complete revolutionization of modern practice when he unknowingly discovered the electron in a phenonema which became known as the "Edison Effect".

A few years later (in 1895), Wilhelm Rontgen, a German physicist, while experimenting with a highly exhausted vacuum tube on the conduction of electricity through gases, observed the fluorescence of a screen — reputed to have been a Barium Platinocyanide screen as commonly employed to-day. Further investigation indicated that this phenomena was due to radiation of "rays", the properties of which were not known, and so they were called "x" rays — a terminology they have never lost. Science was more than interested in the thought that man might now see the structures within his own living body. Dr. William D. Coolidge, who to-day is Director of General Electric research, was one who foresaw the possibilities of x-rays for human good, and among other contributions has given us the Coolidge hot-cathode x-ray tube — the basis of modern x-ray practice.

It is known that radiant energy of all kinds consists of electromagnetic waves (or rays), of a vast range of wave lengths, extending from radio waves, tens of thousands of metres long, to x-rays, less than a millionth of a millimeter in length. Familiar radiations, in the order from low to high frequencies, are radio waves or rays, radio heat waves, infra-red rays, visible light rays, ultra-violet rays (sometimes referred to as black light), then comes a band of radiated frequencies which we know very little about, then x-rays, gamma rays emitted by radium, and finally cosmic rays received from interstellar space. The interesting point is that all are produced by similar electro-magnetic radiations, the essential difference between them being the radiated frequency.

I am not qualified to speak on the nature of x-ray radiation since my study of electromagnetic waves has been devoted to that band of radiated frequencies employed in radio communication systems. It is interesting to note, however, that x-rays are produced by impinging a stream of electrons, at speeds around 100,000 miles per second, on to a metallic target.

Regardless of our particular line of endeavour, all students of electro-magnetic wave radiations, or students of vaccum tube applications in general, are vitally concerned with the same basic laws of electronics. These basic

* Address given by A. S. R. Ruthen, Chief Radio Instructor, Saint John Vocational School, to the New Brunswick Society of X-Ray Technicians at their Annual Meeting in St. John, N.B., on June 22, 1944.

laws are derived from Sir J. J. Thomson's thesis of electronics, which he gave us in 1897 following his investigation of the "Edison Effect". This great English physicist said "atoms are made of tiny, unseen particles of electricity" and the science of physics, which had successfully maintained the atom as the world's smallest entity was forced from its position.

Science was now off with a bound and to-day has brought us to the age of miracles — the electronic age. Across the world, hundreds of types of electronic tubes, from the size of an acorn to cylindrical affairs 25 feet long, serve man's command.

To-day, through electronics, tiny shadows on a film become the voice of the movie artist on the screen. The voice of a speaker or singer, the strains of an orchestra, can be heard around the entire globe in a small fraction of a second. With television we can already see over great distances, and, like our sense of hearing, so will our vision be extended to embrace the whole world — all by the wonder of electronics. Yet — as miraculous as radio might be to-day, it is nothing compared with those developments which will come as a result of the tremendous progress for military purposes during these war years. And all this within the lifetime of many of us.

Outside of communication, electronics is having an equally astounding career. High frequency heating devices — an extension of Radio Therapy — has gone to work in the production of various plastics, and out of it will come new materials for everyday purposes. Electronics easily takes first place in its decisive effect on military techniques in the present war — The rapid development of so-called Radar, which won for us the Battle of Britain in 1940, and stopped the tragic advance of the Germans. The use of supersonics in submarine detection, which has played a tremendous part in winning the Battle of the Atlantic; electronic gun directors and other devices, have all taken their places in winning the war. In industry, too, our little friend the electron is doing a big job — in the manufacture of shells, the building of planes, the control and operation of equipment — he is to be found everywhere. X-rays, which have long been indispensible to physician and dentist, also aid modern industry. X-ray units, now employing voltages going into seven figures, are used to examine the internal structure of heavy metal thicknesses for flaws, thus assuring safer ships, bridges and similar constructions. The chain of applications is endless. A device, known as the "spectrophotometer", which precisely charts colour composition, provides the most reliable method of matching colours. The General Electric tell us that this amazing tool can define two million different shades as against the ten thousand tints detectable by the human eye. Electronic devices control the high-speed wrapping of packages—x-rays inspect candy for foreign materials—inspect fruit—open and close doors—detect icebergs through the thickest fog—sterilize the air in operating rooms — each application inviting further applications.

Electrons In Medicine:

There is little I can tell you of the part electronics is playing in maintaining man's greatest possession — his health.

By Radiography, the recording of x-ray images on a film, enables physicians and surgeons to examine various bones of the body — the skull, the hand, the spine, the chest. .Fractures, like that of the neck of the femur, can be more successfully treated.

By Fluoroscopy they can study internal organs, detect tuberculosis, discover ulcers and tumors that might otherwise not be discovered until too late.

In Radiotherapy, skin disorders are treated.

By Inductothermy, therapeutic heat can be generated in human tissues.

With the Electrocardiograph the war against heart disease gathers strength.

With the Electron Microscope, enabling images to be magnified 100,000 times, physicians can take a look at various germs — and this alone must open up new fields in medicine. Science now knows that the human brain generates electrical thought patterns — another avenue in medical research.

Future possible developments are vast and inspiring, and in association with medicine I would venture to say you have the most interesting and fascinating study in history. "Yes," said George, "When I read about the marvels of electricity, well . . . it makes me stop and think." "Well, well!" replied his friend, "isn't it wonderful what electricity will do." It is wonderful perhaps, yet readily understood. And so, having taken a glance at the end of the chapter, let us for a few minutes turn back to the beginning and take a look at some of the fundamental basic electric phenomena with which this science is concerned.

The Electron:

Our little friend the electron is logically the starting point of any study of electronics. I would suggest that the study of all electric circuits will be remarkably simplified by looking at them through the activity of the electron. What is Electronics? What IS our electron? From whence does he come?

Briefly, electronics is the science of the electron, that infinitesimal, invisible particle of pure negative electricity, the basis of all familiar matter, whether liquid, solid or gaseous. This electron has no mass, as we understand mass. It may be accepted as being the smallest particle of matter, and yet, Sir J. J. Thomson, who originally hunted the electron to its lair, declared his belief that space might be permeated with "granules." These granules must be indeed small if, as Sir Joseph believed, they are at least 3,300,000,000 times smaller than the infinitesimal electron!

The atom is the home of the electron.

Scientists have satisfied themselves, by methods extremely interesting, that the atom is made up of so-called Positive Protons and Negative Electrons This is a simplified statement because it leaves out the recently discovered Positrons and Neutrons, and possibly other "trons" not yet discovered, but is sufficiently accurate for our purpose.

The nucleus of the atom — which forms its mass — is made up of positive protons, with a few electrons bound tightly to it. Around this nucleus the electrons revolve, in much the same manner as the earth revolves around the sun. In fact, our solar system presents a fair picture of atomic structure and gives us one of the most

important conceptions — the astounding emptiness of matter. The most solid substance known is said to be more than 99.9% of nothingness — a very comforting thought when someone hits you on the head with an iron bar!

It has been established that a "field" of force exists around all charged bodies, thus our positive protons and negative electrons have fields associated with them. These fields act so that:

1. Like charges repel each other. That is, two negative charges repel and two positive charges repel.

2. Unlike charges attract each other. That is, a negative charge attracts a positive charge, and vice-versa.

As a result, the electrons (negative charges) are attracted and held within the atom by the positive attraction of the protons. The electrons themselves are kept apart by the repulsion existing between them. Under normal conditions each atom is electrically neutral as a whole, that is, the sum total of the negative electrons just balances and equals the total positive charge of its proton. In this normal state atoms are said to be uncharged electrically, so far as any outside effects are concerned.

The next important point to grasp is the fact that electrons in all the 92 elements, from which all substances are made, are exactly alike.

However, the number of electrons in atoms of the various elements vary, from "one" in hydrogen (the smallest and lightest atom of all) to 92 in an atom of uranium. Besides its 92 planetary electrons, revolving outside the nucleus, uranium has an additnonal 146 electrons packed inside, the whole balancing the 238 protons it contains. The difference between the various chemical elements such as gold, silver, iron, oxygen, chlorine, etc. causing them to differ in weight, taste, colour, strength, electrical conductivity and other characteristics, is merely the difference in the number and position of the electrical charges (protons and electrons) which constitute each tiny atom.

The so-called "Planetary Electrons" revolve around the nucleus in well defined orbits, called "shells." Helium is the atom with two electrons, and this is the second lightest solid substance. It also has its two electrons, and in another orbit, far outside that of the first two, is a third one.

As we go through the list of elements, each one adds another electron to the outer shell — Sodium, for example, has three shells. As elements become more complex in structure successive shells are built up, until we find the electrons of uranium revolving in 7 shells — with 2, 8, 18, 32, 18, 13 and 1 electron in each respectively as counted from the inner one. These electrons continuously oscillate at various frequencies. Those in the outermost shells of most atoms and ions have their charactristic frequencies in the Ultra-Violet. Those in the inner shells radiate in the x-ray region because of their greater potential energy.

Seven is the maximum number of shells in any element. There are never more than two electrons in the inside shell. The capacity of the shells, from the inner to the outer shell, are 2, 8, 8, 18, 18, 32, 32.

Peculiar among all the elements are those contented atoms with full outer shells (32). These do not combine

readily with other atoms. Atoms with incomplete outer shells tend to be more sociable, combining with others to fill the vacant outer spots in their envelopes. Even more interesting are those atoms with only one, or a few, electrons in the outer shell. These poor, lonely electrons, whose bond to the nucleus is comparatively weak, may be knocked loose from their parent atom, by collision with another electron — or by other means.

Free Electrons:

When electrons are somehow pushed out of their atoms into the cold, cold world — a process known as "electronic Emission" — we have electrons in space . . . and the fun begins. An atom which has lost one or more electrons, becomes a Positive Ion. That is, it is now electrically unbalanced, with a predominating positive charge. Several established methods are employed in obtaining electronic emission, the most common being "Thermionic Emission." This is the type of emission used in the popular Coolidge type x-ray tube. Other methods are equally interesting and useful, but space will not permit the consideration of more than one.

Before going on, let us recall the salient points which provide us with essential basic conceptions:

1. The fact that the electron exists in all matter — it is not manufactured or generated.
2. All electrons are the same regardless of the element from whence they come.
3. The electron is a negative body of electricity, and will, therefore, be attracted by a positive charge.
4. The electron is infinitesimally small.
5. The electrons within an atom are always on the move, spinning in their respective orbits. The revolving electrons are called "planetary" electrons to distinguish them from electrons which remain in the core.
6. There is a relatively large amount of empty space around the proton. This is an important concept because it helps us to understand how the electrons can oscillate within the atom and produce the various rays. If you imagine a large auditorium with a chandelier in the centre and a few flies buzzing around in circles, you grasp some idea of the construction of an atom. The following is quoted from a magazine that I came across recently, and aptly describes our electron within the atom:

There was once a tiny electron,
Who looked all about him and cried:
"What an infinite thing is an atom!
How long, and how deep, and how wide!"

Electric Current:

If some means can be found to knock off — or cause the outside electrons to be emitted from a great many atoms, and impel these free electrons in a certain direction — either along a wire, through a gas, or through a vacuum, we have an "Electron Flow," known as an Electric Current. There are three kinds of electric currents:—

1. Conduction Current, which is the flow of electrons through a conductor.

2. Convection Current, which is the movement of electrons or ions through a gas or vacuum.
3. Displacement Current, which is the momentary shift of electrons within an atom (without the electrons leaving their atoms), as takes place in the insulator or dielectric of a condenser.

Insulators and Conductors:

The difference between conductors and insulators is merely determined by the ease or difficulty with which electrons leave their atoms. Substances with complete outer shells might be expected to be good insulators. That is to say, when a voltage is applied across such material, such as pyrex, glass, dry air, etc., electrons are not forced from the atoms and therefore no current flows. Substances with incomplete outer shells, like silver and copper, are good conductors.

Thermionic Emission:

All practical tubes to-day obtain a supply of electrons for their operation by means of a body called a Cathode. The most common is the Hot Cathode type.

When certain substances are heated, the agitation of the electrons within the substance is increased to such an extent that electrons are thrown out of the substance — that is, they are emitted. It has been found that the oxides of the rare earth metals, Thorium, Barium, Calcium and Strontium, give off an abundant supply of electrons at reasonably low temperatures. Therefore, these substances (together with others to give them mechanical strength), go into the making of hot cathodes. It is, then, only a question of heating this element to a point where it emits electrons. Any means may be used to accomplish this, but because of its convenience an electric current is normally employed.

When a current is passed through a conductor, heat is developed and the power consumed in heat is equal to the current squared times the resistance. (I^2R watts).

From this we can create a mental picture of the condition existing around such a cathode. Thousands, millions of electrons are being shot out, leaving the cathode with a positive charge. As a result, the electrons are not free very long and are drawn back to the cathode and emitted again. Hence, around the cathode we have a Cloud of electrons, representing a negative charge, which is called the Space Charge.

The Plate or Anode:

Now, having got electrons into space, they are more or less at our mercy. By means of a Positive charge we can attract them and draw them in varying numbers towards the positive charge. In television or cathode ray tubes we can cause them to deviate from a direct path, and trace a picture on the end of the tube.

The simplified action merely involves the movement of a large number of electrons directly towards an element known as the Plate or Anode. This element is positive because it is short of electrons. Therefore, like a hungry lion it lies waiting to attract all electrons which come under the influence of its charge.

The elements are placed within a vacuum to enable the electrons to have a free path in their movement. Some tubes are filled with gas to produce other results.

The movement of electrons to the plate constitutes an electric current, and this movement continues in a circuit (connected between anode and cathode) so that the electrons can be carried back to the cathode. This circuit is called the Plate Circuit or Anode Circuit, and the current in it, the Plate Current or Anode Current.

In x-ray tubes, extremely high voltages are used to supply the positive attracting force on the plate and set the electrons in motion. This causes the electrons to rush across the tube at a terrific speed, causing the radiation desired.

Electric Circuits:

In all electrical circuits we have Three main factors to consider:—

1. Current—whose strength is represented by the number of electrons in motion, and is directly proportional to:—
2. Voltage, which is the attractive force (or pressure) applied to set them in motion.
3. Resistance——the opposition (represented by the hold that protons have on their electrons) which must be overcome to set the electrons in motion. The current is, of course, inversely proportional to the resistance.

The relationship between these three factors is expressed by Ohm's Law:

$$I = \frac{E}{R}$$

Here again, there are several salient points to grasp before any attempt is made to advance further:

1. Before an electric current can flow there must be a complete circuit.
2. An electric current is merely the circulating of electrons already present. We do not generate electricity but merely supply a charge or pressure, measured in terms of volts, to set electrons in motion.
3. Electrons move along a circuit towards the positive charge. That is, negative to positive. (Electric "Current" in accordance with the old, conventional theory is referred to as flowing from positive to negative). Do not allow this to confuse you. They are one and the same thing.
4. Voltage is a "potential" force, and may, or may not, cause a current to flow, depending on circuit conditions.

Magnetism:

Synonymous with electricity is magnetism. Whenever an electric current flows it will have a magnetic field associated with it. Electric currents may be "direct," that is, flow steadily in one direction; "pulsating," that is, flow in one direction but vary in strength; or "alternating," that is, flow alternatively, first in one direction and then the other, at various rates called the frequency. As a result, magnetic fields, whose strength depends on the strength of the current, may be steady or rise and fall. Electric currents produce magnetic fields, and conversely, magnetic fields will produce electric currents.

We have covered a lot of ground in a few minutes, but I would suggest that a full, comprehensive conception of these basic actions will greatly simplify and clarify the more advanced work dealing with the application of these principles. When studying, visualise. Travel with the electrons and "see" how these little fellows get around.

Do You Search for Early Editions?

By H. H. MURPHY, B.A., M.D.
Director, Dept. of Radiology, Royal Jubilee Hospital, Victoria, B.C.

When I was an undergraduate in McGill a story was current which may or may not have been true. Mr. C. H. Gould was supposed to have endeavoured to interest Sir William MacDonald in the purchase of some early editions for the University library and to have been told, "I would as soon purchase a collection of old shoes." I think that most of the students who repeated the story felt that a very reasonable and satisfactory answer had been given. To youth the old book was not of interest; it was the one just out or to appear next month which held the spotlight.

And yet, of course, as everyone knows, the case for the early edition needs no support to-day and my plea is for each reader of "The Focal Spot" to seek diligently through the often unpromising second-hand bookstores of his or her community. In the first place you will meet interesting people — in any of the larger communities the proprietor of a used book store is worth knowing. In the second place there is a wonderful intellectual stimulus in finding an early publication on Radiology and reading it in the light of to-day's achievements. You have to-day in your routine work the practical answer to many of the problems facing these pioneer workers; their thought and work made possible the radiology of to-day — they were the giants on whose shoulders we stand and survey the broad field of Radiology.

It was recently my good luck to find a third edition of "Practical Radiography" by A. W. Isenthal, F.R.P.S. and H. Snowden Ward, F.R.P.S., which was published in London, England, by Dawbarn and Ward in 1901. I will mention here that the initials following the names of the authors signify "Fellow of the Royal Photographic Society;" in other words, the authors were neither physicians nor physicists but photographers. The book opens with an illustration of a double-barrelled shotgun — the original by Professor Roentgen and showing his notations of the interpretation of the various shadows demonstrated. The first paragraph of the introduction is worth quoting: "The first edition of this book — the earliest handbook of radiography in any language — was issued in May of 1896, when the subject was less than six months old."

Even the actual terminology for the new specialty was in flux and the following terms are mentioned: Rontography, Shadowgraphy, Skiagraphy, Ixography, Pyknoscopy, Electrography, Scotography, Kathography, Fluorography, Actinography, Diagraphy, and Radiography. The latter term introduced by Dr. Hill Norris was considered most suitable by the authors and we know that time has justified their choice, although many feel, and I think justly, that it would have been wiser had the word Skiagraphy been the final selection.

As in all the earlier works considerable space is given to types of equipment and to localization of foreign bodies. There is much discussion of sensitive plates and emulsions — single coated films and double coated films and, what will surprise most of us today, we learn about "Ferrotype plates" (sensitive emulsion on sheets of black lacquered iron) — and then as now the discussion is closed with the statement — "There is no best plate or film." Stereoscopic studies are mentioned, as is the use of the new energy in veterinary medicine.

In clinical medicine small urinary calculi had been detected, as well as hypertrophic changes in joints. Many fractures and dislocations had been described, impacted and unerupted teeth had been shown and already the problem of distortion had been recognized. A few skin diseases had been treated with apparent benefit and the danger of a "delayed action" of the new rays on the skin was known.

Search your second-hand book stores — you may find a copy of the first edition.

If you are not successful you may be rewarded by securing a copy of a little book published by Macmillan & Co., in 1910, under the title of "Diseases of Bone." It was written by Edward W. H. Shenton, M.R.C.S., England, "Senior Radiographer" to Guy's Hospital. It is a small book of only 72 pages and there are 46 excellent illustrations — mostly full page. The main chapters are: (1) Inflammation in Bone. (2) Tubercular Disease (the terminology is given as in the text). (3) Osteo-arthritis. (4) Growth in Bone — this section deals with malignant and non-malignant but not with the problem of physiological growth; and (5) Osteo-malacia.

You will find here described "Shenton's line" which was of so much significance in the days when detail in a film of the hip joint was not what it is to-day — especially in the presence of tuberculous disease.

Or you may find — for the book had a large circulation — a copy of a really remarkable book written by Dr. Francis H. Williams of Boston, "The Roentgen Rays in Medicine and Surgery," published by the Macmillan Company.

The first edition appeared in 1901 and the third edition, which I have, in 1903. Dr. Williams was born in 1852 and died in 1936. He was a graduate of the Massachusetts Institute of Technology, 1873, and in medicine of Harvard, 1877, and you will find an interesting biographical sketch in The American Journal of Roentgenology, July, 1936, page 106, from which I cull the following:

"By the beginning of 1898, hardly two years from the moment of Roentgen's discovery, and through the medium of the fluorescent screen, he had publicly discussed the application of the roentgen rays to the diagnosis of thoracic aneurysm, pericardial effusion, cardiac hypertrophy, cardiac transposition, emphysema, pleurisy with large or slight effusion, pneumothorax and pulmonary tuberculosis. In addition, he demonstrated that early or central pneumonitis can be revealed by Roentgen rays when ascultatory evidence of their presence is not discernible. . . . In 1899 Dr. Williams and Dr. Walter B. Cannon carried out some of the very earliest investigations by means of the fluoroscope, on the human

alimentary tract . . . From the very start of his work he felt that radiations of such power of penetration must be inimical to the integrity of living tissues and forthwith Dr. Rollins and he adopted every means to protect themselves and their patients. . . . Both he and Dr. Rollins reached the completion of their long and useful careers without physical blemish resulting from the untoward effect of radiation from either roentgen rays or radium."

The interesting thing is that this book was published first in the city of Boston — an overnight train journey from Dalhousie, Montreal, Toronto, Kingston or London in Canada and many other teaching centres in the United States. Dr. Williams was already a man of established and outstanding reputation and his studies included in this book outline the basic principles and their application in all the usual examinations made in our Radiographic laboratories to-day with the exception of the recently developed intravenous contrast media. This book was no pamphlet — it is a solid well-bound work of 757 pages — it was published by a reputable publishing company and yet many years were to pass before even the most meagre radiological mental food was offered to our medical students and to-day it is the exceptional student who has even the most elementary knowledge of the subject. Such, according to our biographer quoted above, is "the common experience of the pioneer."

Before closing I might suggest that you watch for the early issues of medical journals which occasionally have articles on the new science. A small cloth bound volume of "The Practitioner" — an extra number on X-Rays in Diagnosis" appeared, but curiously there is nothing to indicate the date of publication. Early in the present year I wrote to the publishers to ascertain the date of publication and received the following: "Replying to your enquiry of March 27th we would say that "The Practitioner" changed hands in 1929 and the present proprietors know very little of the volume to which you refer. They are of the opinion that it was published in the early part of 1906 . . . "

But then if only a few of the readers of "The Focal Spot" become really interested I am sure they will find many other treasures equally or more interesting. Good luck in your search.

Editor's Note: Through the kind permission of the publishers of the American Journal of Roentgenology and Radium Therapy we are able to reproduce on the following pages the illustrations and article by Dr. Sherwood Moore which appeared in the October, 1944, issue of the Journal. This forms an interesting addition to the foregoing article by Dr. Murphy and should stimulate our readers in their search for early editions.

A Historical Note on Roentgenologic Literature*

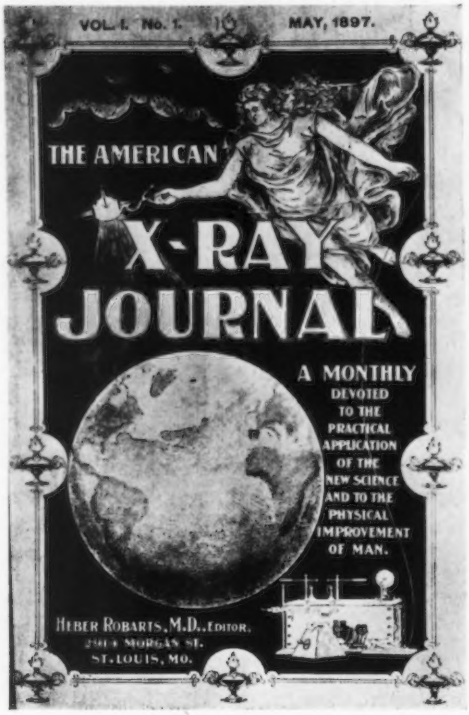
Having recently come into possession of Volume 1, No. 1, of the American X-Ray Journal which made its appearance forty-seven years ago, it seems worth while to publish some notice of this ancester of the American Journal of Roentgenology and Radium Therapy.

The announcement of the advent of the American X-Ray Journal, written by Heber Robarts, M.D., Editor, contains many points which are sound even at this time. The American X-Ray Journal was the second published in English and the first published in America. It was preceded by the Archives of Skiagraphy which was published in London in 1896.

The editor of the American X-Ray Journal was both the first and second president of the American Roentgen Ray Society founded in 1900. The office of the journal and of its editor was located at 2914 Morgan Street (now Delmar Boulevard), St. Louis, Missouri. The photograph of this house indicates the descent of a neighborhood from one of relative affluence to one of abject poverty.

Few files of the American X-Ray Journal are in existence and many, if not most, radiologists are unaware of the existence of this publication important in its day. The great number of present day radiological publications obscures the significance of these early efforts.

From the meagre beginnings at the time of Roentgen's discovery, November 8, 1895, there is now a world wide roentgenologic literature. The Army Medical Library in Washington lists thirty-five such journals.


VOL. I. No. 1. MAY, 1897.
THE AMERICAN
X-RAY
JOURNAL
A MONTHLY
DEVOTED TO THE PRACTICAL APPLICATION OF THE NEW SCIENCE AND TO THE PHYSICAL IMPROVEMENT OF MAN.
HEBER ROBARTS, M.D., EDITOR.
2914 MORGAN ST.
ST. LOUIS, MO.

We are also indebted to The American Journal of Roentgenology and Radium Therapy for the following extract from the Book Reviews:

BRADFORD, DONALD. A belated review. Brit, J. Radiol.. Aug., 1942, 15, 224-227.

This is a review of a book published in 1896, soon after the discovery of x-rays by Roentgen in December, 1895. It was not written by a roentgenologist but by a schoolteacher, Arthur Thornton, M.A., who was a teacher

*Courtesy of THE AMERICAN JOURNAL OF ROENTGENOLOGY AND RADIUM THERAPY, Vol. 52, No. 4, 1944.

THE AMERICAN

X-RAY JOURNAL.

A Monthly Journal devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. I. ST. LOUIS, MO., MAY, 1897. NO. 1.

THE AMERICAN X-RAY JOURNAL,
PUBLISHED MONTHLY.

TERMS SUBSCRIPTION DATES—IN ADVANCE.

HERBERT ROBARTS, M. D., EDITOR,
1004 MORGAN STREET, ST. LOUIS, MO.

ANNOUNCEMENT.

No apology is considerpl necessary for undertaking the publication of the AMERICAN X-RAY JOURNAL, the "first born" of its kind, and a journal in line with human thought and the practical needs of men.

Fifteen months have passed since the Wurzburg professor first announced the discovery of the x-ray, and no great has the interest become that every item pertaining to the new science is grasped by the public press with avidity. The claims made by Professor Roentgen were received at the time with commingled incredulity and amusement, and are even at this date not properly appreciated by some professional reading people.

The medical profession have a record for amplifying, pruning and utilizing new facts for the benefit of humanity and themselves, but in this instance there are financial, mechanical, and technical difficulties which must be surmounted by them before the rays can be practically applied. Again, inefficient apparatuses are everywhere used by exhibitors and forced upon the attention of doctors. It is on account of these facts that physicians do not readily adopt the new science, notwithstanding the public clamor for its use.

The ease and certainty of diagnosing some surgical affections has advanced more in the past twelve months than any previous hundred years. In the first experiments with the x-rays it was thought possible to photograph only the bones of the hands, and this only after long exposure, while examinations with the fluoroscope were considered too tedious and impracticable. But the usefulness of the x-rays has so rapidly extended that no bone of the human body has escaped successful photography, and the bones have been examined directly with the fluoroscope.

Successful work is being done also in diagnosing cases of cancer, tumors, appendicitis, gall stones, renal and urinary stones, exostosis of the cranium and blood clots, in addition to the more common cases of fracture, diseased joints, and the locating of foreign substances in any portion of the body. In the fluoroscope the heart is observed and studied in its movements, the diaphragm is outlined and seen to rise and fall with respiration, and the visceral organs can be studied.

The application of the x-rays has been used with success in certain cases of the blind, in nervous twitching, tremulous agitations of the hands and body, and also the annoying rotatory movements of the eye-ball (nystagmus). Other avenues of inquiry have been opened for the x-ray application, notably cold abscesses within the body, degenerative germinal affections, especially consumptive abscess and the early diagnosis of this disease, and also the practical use of the x-ray in dentistry.

It is the design of this journal to give to readers and thinkers a faithful resume of all x-ray work done in any portion of the globe. The editor's personal experience with the x-rays for practical purposes, together with seventeen years of medical and surgical experience, filling many official medical positions, and traveling largely in search of medical facts, renders the task of imparting x-ray information more appropriate for those who read and think. It is the intention of the promoters of this journal to give to the world only truthful results, with full credit to the experimenter in all its relations to the new science.

This field of inquiry must have associated with it practical and useful adjuncts. The most essential which shall occupy space are medico-legal jurisprudence, the therapy of electro-medical sciences, preventive medicine, hygiene, dentistry, and collateral branches.

We shall favor correspondence with pro or con criticism so long as it deals with the subject matter of the journal.

No advertisements shall appear in this journal that savor of quackery, deception, or fraud.

Medical and scientific publications reflect the offings of individual thought, and the press gives the practical side and vitalizes the facts. Their work must be equally commended and personal gratitude acknowledged.

The conduct of this journal shall not be arrogant, defiant, or bigoted, but it will have the courage of conviction to press forward the truth as we understand the truth. It will be ethical, as the dictates of every breast should be, regardless of any written code devised by man for another's guide. There will be no personal venom, as we hold an animus against no man, but false principles will be attacked with the vigor of our ability. This is a pioneer journal of x-ray work. We are not imitators. We are casting our hopes among the needs and wants of man. We expect encouragement.

While it can not be expected nor desired that we shall escape just criticism, and it may be commonly, yet our aim shall be to improve each coming journal, encouraged as we are in the faith and usefulness of our mission.

HERBERT ROBARTS, M. D., Editor.

A PREMIUM OFFER.

The subscription price of the AMERICAN X-RAY JOURNAL is $1.00 per year. With this price is low when the character of the journal is taken into consideration, we have made arrangements by which we can offer additional inducements to subscribers. We will send the JOURNAL for one year and the following named books pertaining to x-rays at the prices annexed:

"A B C of the X-Rays" (price, 75 cents) and the JOURNAL for $1.50.

"The X-Ray or Photography of the Invisible" (price, 75 cents) and the JOURNAL for $1.50.

Both of the above books and the JOURNAL for $1.80.

"Roentgen Rays and Phenomena of the Anode and Cathode" (price, $1.50) and the JOURNAL for $2.00.

These three books are richly illustrated, beautifully printed on coated paper, and handsomely bound in cloth.

THE great number of questions coming to us through the mail seeking information in regard to the x-ray have become too voluminous and too important for individual reply. We have concluded, therefore, to make a catechismal text of these inquiries, and annex to each a brief answer or definition. Calculating from what we have seen, and the probable result from general extended requests for further questions as a basis for judgment, we feel confident of being able to continue

in one of the provincial grammar schools. It shows the great interest aroused in all scientifically minded people by the discovery of the rays. Curiously enough, many of the modern developments in roentgenology were forecast at that early date and the early theories discussed in the book are strikingly like those generally accepted to-day. For example the ionization measurement of intensity is generally thought to be quite modern but Thornton describes a method which established the property of ionization. At that time biological effects were not realized, however, and there was no reference to any precautions being necessary in handling the rays. Several pages of the book are reproduced.—Audrey G. Morgan.

A Simple Method of Making

Direct Negative Copy from an X-Ray Film

By C. GODWIN
Edmonton, Alberta

The only requirements for making direct negative copies of x-ray films are a printing frame, size 14″ x 17″ and a bright sunny day; these together with a little experience will produce films which are, in most cases, superior to the original x-ray film.

Being unable to find a 14″ x 17″ printing frame, I have made a good substitute with a piece of stiff cardboard, covered with black paper and a 14″ x 17″ sheet of clear glass. The printing is done in the same manner as the old time printing-out-paper (P.O.P.).

The first procedure is to study the films to be printed; they will no doubt be of varied densities; the main point to study will be that portion of the film containing the pathology. It can be noted here that, like all photography, the better the original film, the better the finished copy; but a good copy can be made of almost any film. It is also advisable to keep a record of each exposure in case a check or repeat copy has to be made. A good plan is to clip an estimated exposure to each film during the study; this will save time and retakes caused by errors of judgment although a good deal of latitude will be found in this process.

Step number two takes place in the darkroom where the printing frame is loaded. Be sure not to use non-screen film; a film for use in intensifying screens is the only film suitable. Load the printing frame with radiograph and x-ray film as for ordinary photographic printing. Close back, and the frame is now ready to be placed in the sun. While going from the darkroom to the outside sunlight, be sure to cover the face of the printing frame with a sheet of cardboard. This will prevent light rays striking the film at different angles; it is important that the frame be placed at right angles to the sun and be absolutely certain that the frame is not moved during exposure, otherwise a blurred result will be obtained. Use the sheet of cardboard to cover the frame after exposure and during the trip back to the darkroom. With regard to the direct sunlight, an open window facing south is suitable; a few wooden blocks will help in adjusting the angle and in giving support to the frame during the exposure.

And now for the exposure — I have found that a radiograph of average density (i.e., what we technicians would call a dandy) would be exposed in 20 seconds during the hours 10 a.m. to 3 p.m. in the summer time; slightly longer exposures should be given in the winter. It will be found that a longer exposure will tend to give the film less density (lighter) and a shorter exposure than 20 seconds will give it a much greater overall density. With an

x-ray film of considerable density, it is possible that an exposure of up to two minutes will be required, although I have found that there is a limit to the exposure and over this limit there is a tendency towards more density again.

It will be necessary for anyone doing this work to make a few tryouts to become acquainted with the details of the complete procedure. It is neither hard nor complicated and it is surprising how soon fairly correct judgement of exposure can be accomplished.

After the film is exposed, the frame is taken back to the darkroom for developing. Be sure to cover the face of the frame to prevent light from reaching it, as mentioned before.

Development is the same as for an ordinary x-ray film, the time and temperature method, with the rinse and fix as usual. If the directions have been faithfully carried out and the exposure accurately judged, you will see a finished product that is much superior in contrast to the original. It is also possible by this method, to have the density under complete control, but of course, detail that is not in the original film cannot be reproduced in the copy.

Technical Tips

With the new prepared hypo powder one gets nearly smothered when shaking it into the mixing container. I have found this can be largely eliminated by immersing the opening in the can under the water and shaking the powder out under the water. It saves sneezes.

W. Q. STIRLING, Vancouver.

If your developer is cold and your surrounding water tepid (not hot, of course), you can speed up the developer action by dipping the film into the warm rinse and then back into the developer again.

ETHEL STYFFE, Toronto.

If you want to wash the emulsion from a hardened film or lantern plate, put a little carbonate of soda in the hot water. This causes the emulsion to swell as it does in the developing process and it comes off quite easily.

H. J. MENAGH, Toronto.

If you make up your own reinforcing developer from the separate chemicals don't put in any Bromide or the tank will soon get too much Bromide in it.

Save the drips and the gallons will look after themselves. If you are tired of making up reinforcing developer so often, try investing from seven to ten seconds in allowing the developer from a developed film to drip back into the tank before rinsing and fixing. You'll be surprised.

L. J. CARTWRIGHT, Toronto.

News Clippings

We noticed the following despatch from Moscow in the press recently. Having had some experience of the manner in which technical matters become exaggerated and distorted in the daily newspapers we feel like taking it with a pinch of salt. However we pass it along to you with the comment that it is interesting, if true.

Millionth-of-One-Second X-Ray Developed by Russ

An x-ray apparatus using an exposure of 1,000,000th of a second and capable of photographing the strain on an engine bearing in motion has been perfected by two young physicists of the Institute of the Soviet Academy of Sciences, L. Altschuler and V. Zukkerman.

"For years scientists have been perfecting methods of investigating the internal structure of metals," they explained through an official statement. "But usually their samples have been x-rayed in the static state. We wanted to record the performance of metals at work, so we had to increase the sensitivity of our x-ray apparatus to the maximum."

British physicists, they said, had constructed a 100-kilowatt apparatus for the same purpose but its tubes were so delicate and expensive that it could be used only in specialized laboratories. The Altschuler-Zukkerman apparatus operates on ordinary electrical current and therefore can be used in any factory laboratory, they explained.

X-Ray Finds a Ring

The value of the x-ray was proved in an unusual way in a Toronto hospital recently. A woman with a broken hip lost her diamond ring while she was in the operating room. Nurses, orderlies and others searched high and low without success. Some time afterwards the patient returned for an x-ray to make sure that the fracture had been properly set. When the x-ray specialist developed the negatives he was astonished to see the ring in the woman's stomach. It was duly recovered and restored to its owner. Hospital authorities naturally were pleased over the outcome.—Editorial page, Toronto Globe & Mail. Jan., 1945.

Wonderful Thing, the X-Ray!

It is interesting to know what is going on in other countries in our particular line, so we append the following clipping from The Yorkshire Post, England (Oct. 3, 1944):

Mass Radiography Unit At a Leeds Factory

The first visit to a factory of the mass radiography unit, stationed at St. James' Hospital, Leeds, took place at Montague Burton's, Ltd., yesterday, when queues of clothing workers booked appointments for a chest and lung check. by means of miniature x-ray photographs.

This powerful new drive, launched by the Ministry of Health with the backing of local authorities, aims to safeguard the health of the nation by detecting disease in its early stages before any outward symptoms appear.

It has been likened to the regular checking up on an aeroplane engine, and met with a tremendously keen response at Burton's, where there have been nearly 3,000 volunteers already. They booked in at the rate of 12 every five minutes, and passed before the camera about 150 to the hour.

All findings are confidential. Notices in the dressing rooms of the Welfare Department inform workers that if they do not hear within 10 days they may regard themselves as having a clear record. As previously explained over the works loud-speaker system, the radiograph is examined by a doctor and if the miniature shows any abnormality of the chest or signs of a faulty heart the worker is asked to attend so that a larger photograph may be taken for diagnosis.

The cost is free to the worker. The firm covers their time, the local health authorities pay the expenses and the Ministry provides the apparatus.

This unit, the first in Yorkshire, is one of a limited number to be built after two years' research. It weighs over two tons and was transported to the factory on Corporation lorries and installed with the aid of a crane for lifting buses.

"By preventing chronic illness and saving life it should, in time, cancel out all the lives lost by the war," said Mr. A. Leffler, organizing secretary, yesterday. Arrangements are being made with other large factories to follow suit.

If you see any item with x-ray interest in your newspaper, clip it out and send it to the Editor, giving name and date of newspaper.

Dr. Frank C. Neal

Peterborough, Jan. 19 (CP)—Dr. Frank C. Neal, 67, died suddenly at his home here yesterday while examining a patient.

Born in Brussels, Dr. Neal was a graduate of Toronto University and did post-graduate work in London., Eng. He was a fellow of the Radiological Society of North America. He practiced 40 years in Peterborough.

He is survived by his widow, the former Bertha Reycraft, and one son, Allen Neal, of Baltimore.

Many Ontario members will recall the visit in April, 1940, to the Peterborough Clinic with which Dr. Neal was associated as Radiologist. His death comes as a distinct shock to us and we extend our deep sympathy to his widow and son in their sudden bereavement.

The death of Dr. Bernard T. McGhie, Deputy Minister of Health for Ontario, at the early age of fifty-six, brings a feeling of personal loss to many of our Ontario members. Dr. McGhie was one of the best-known medical men in Canada and gave many years of service to the province in various health department posts. Although not a radiologist he was on more than one occasion sympathetically helpful to our Society and many members will recall hearing him speak at a recent Ontario Convention.

Mr. Percy Ghent had an interesting article in the Toronto Evening Telegram the other day on Fluorography, based on the excellent article by Mr. R. S. Connell of Fort Qu'Appelle Sanatorium, Saskatchewan, on that subject in the October Focal Spot, to which he gives acknowledgements, and also on a personal interview with Mr. Connell. The article carried the heading "Entire Population of Saskatchewan Now being X-Rayed."

We would like to acknowledge receipt of an attractive Christmas Card from the Nova Scotia Society. The card is engraved with the inscription "The Season's Greetings and Best Wishes for Christmas and the Coming Year. Nova Scotia Society of Radiographers, Halifax, Nova Scotia." We may be wrong, but as far as we can recall this is the first card we have seen printed with the name of one of the Societies.

We note with interest that the New Brunswick Society of X-Ray Technicians has joined the ranks of the societies with crests above their Provincial News. The new crest has an interesting design depicting a rotating anode tube with a ship in the background indicating the maritime nature of the province and a lion above suggesting its Scottish forefathers.

Speaking of the Next Convention—

A Suggestion Regarding Financial Co-operation

By HERBERT M. WELCH, Calgary
President Alberta Society of Radiological Technicians

The success of our next Convention will depend on the number of delegates able to attend the Convention. The achievements of our Society for the following year will depend on the success of the Convention. In view of these facts, I would like our members to give some thought to the question of the delegate's expenses.

At the last Convention I had hoped to have this matter discussed, but lack of time did not permit such a discussion. Probably, the ideal way to meet at least travelling expenses of the official delegates would be to have the Canadian Society pay a portion of such expenses and the Member Societies the balance. Our Society is not yet in a financial position to do this and the alternative, I believe, is the "pooling" of such expenses. In consideration of this question, let us remember that while this year the Convention is to be held in Montreal, next year it may be held in the West. We should take a long view of the question, as over a period of years the cost to various Member Societies will be fairly well equalized. We have eight Member Societies that are entitled to send one official delegate each, and here is what it will cost each delegate who attends the Convention in Montreal.

These costs cover first class return fares and return berth, including tax. Vancouver, $212.00; Calgary, $179.45; Regina, $141.00; Winnipeg, $114.95; Toronto, $29.60; St. Johns, $40.25; Halifax, $50.30; Quebec, $10.10.

If, as suggested, we have these expenses "pooled", it would cost each Member Society $97.00 for the travelling expenses of their delegate. I would like to see this question discussed at the Montreal Convention and it is with this in mind that I am bringing it to the attention of our members now for their consideration.

Perhaps we can get the opinions of others in the next issue of The Focal Spot. Whatever action is taken on the above suggestion, let us be prepared to have every Member Society represented at the Montreal Convention.

News Items from the Provinces

ALBERTA SOCIETY OF RADIOLOGICAL TECHNICIANS

Our Provincial President, Mr. H. M. Welch, paid a visit to Edmonton in October to discuss with the Edmonton Society, matters arising out of the report he made on the Dominion Convention. A copy of this report had been sent to all members of the Alberta Society and also the British Columbia Society.

Our November meeting was held at the home of our old friend, Cam. White, and after a brief business session, a pleasant social evening was spent, climaxed by a delightful supper served by our hostess.

We have received a very interesting synopsis from our Editor showing the sources of The Focal Spot material in Volume I. Alberta did not do as well as they could have done; let's do better this year. Send in your contribution — especially technical articles.

Would it be in order to ask the Quebec Society to let us know about some of the Quebec laws prior to the convention?

Members of the Calgary Society are enquiring when certificates are going to be issued to members of the Dominion Society.

The following are the officers for 1945:

President
MR. HERBERT M. WELCH
Colonel Belcher Hospital, Calgary, Alberta
Secretary-Treasurer
MRS. ETHEL C. YEREX
Colonel Belcher Hospital, Calgary, Alberta
Vice-President
MR. GEO. MacMILLAN
University Hospital, Edmonton, Alberta
Northern Representative
MR. CLIFF GODWIN
601 McLeod Building, Edmonton, Alberta
Southern Representative
MRS. M. SHAW
Calgary General Hospital, Calgary, Alberta

H. M. WELCH,
President Alberta Society.

CALGARY SECTION

The Banquet Hall of the Empress Hotel in Calgary was the scene of the annual banquet of the Calgary Society on the 19th of December, 1944, which was presided over by Mrs. A. R. McIntyre, the President of the Society. The guests of honor were the Calgary radiologists, along with Mr. Frank Holden from Edmonton and Barry Cartwright, son of our esteemed Editor, who is at present stationed in Calgary.

The evening got away to a good start when the Radiologists entertained the technicians at a cocktail party, after which a very nice chicken dinner was enjoyed. A hilarious entertainment was provided by members of the Society which included a sing-song, two solo numbers by Mrs. R. Cunniffe and a review of the personal activities of each member was made by Santa Claus and his recording angels. The show closed with a chorus girl routine done with expert finesse by three male members who prefer to remain anonymous. There was no question about the identity of two of these chorus girls, but there is still some doubt about the third "male" member. Our thanks to the committee in charge, for a most enjoyable evening.

The annual meeting of the above Society was held in the Colonel Belcher Hospital on January 15th, 1945. This was a business meeting only when the annual reports of the Alberta Society and the Calgary Society were presented and officers elected for the current year.

The Edmonton Society had requested Mr. H. M. Welch, President of the Alberta Society, to carry on for another year; the Calgary Society endorsed this suggestion. The nominating committee for the Calgary Society had some difficulty in obtaining a nomination for President. Mr. Welch had consented to stand if they were absolutely stuck. At this meeting it was suggested that it would be an advantage to have the president of the Alberta Society and the Calgary Society combined and as no further nominations were forthcoming, Mr. Welch was elected.

Calgary Society of Radiological Technicians

President
MR. HERBERT M. WELCH
Colonel Belcher Hospital, Calgary, Alberta

Vice-President
MR. SID MATHEWS
Calgary Associate Clinic, Calgary Alberta

Secretary-Treasurer
MISS P. SPOONER
Calgary General Hospital, Calgary, Alberta

Focal Spot Sub-Editor
MISS VERA WHITE
714 Southam Building, Calgary, Alberta

EDMONTON SECTION

Each member received a full, detailed report of the happenings at the Dominion Convention and we are indebted to Mr. Welch, our Provincial President, for his fine report. Members of the Executive were the guests of Mr. Welch at a dinner which was held at the Corona Hotel in November and he also attended our monthly meeting to give the members first hand information as to the Dominion Society activities at the Convention. The meeting was well attended and I am sure that all were satisfied that the meeting was a great success.

The following are the new officers elected for 1945:

President
MR. A. FLOWER
Vice-President
MR. C. GODWIN
Secretary
MISS M. DUGGAN
Executive
MISS B. ALLEN
MISS L. ALLAN
MR. G. McMILLAN
MR. R. MURPHY

Season's greetings to all our members from the Edmonton branch and thanks to the Editors and staff of The Focal Spot for a good job.

BRITISH COLUMBIA SOCIETY OF X-RAY TECHNICIANS

Election of officers for 1945 was held on December 14th. The following are now responsible for the success of the B. C. Society for 1945.

President—W. Q. STIRLING.
Vice-President—F. A. MONK.
Secretary—MISS McMILLAN.
Treasurer—MISS M. RICHER.

Other members to the executive will be appointed at the next meeting on January 11th.

In future, meetings will be held on the first Thursday of each month. It is our intention to have items of interest discussed and also to have lectures by capable members on various topics of x-ray.

I wish to make an appeal to all members to attend our meetings. A much better spirit is now evident and with the assistance of all members we hope to really put our organization on a sound footing.

The executive wishes to extend to all members both in B.C. and across the whole Dominion a sincere hope for a happy and successful New Year.

W. Q. STIRLING,
President.

MANITOBA SOCIETY OF X-RAY TECHNICIANS

At the December meeting of the Manitoba Society of X-ray Technicians, Dr. R. A. MacPherson gave a very interesting and instructive talk on "Unusual Aspects of Radiography in which the Technician is involved." While some of the procedures he described were ones which most of us have never encountered, it was helpful to have the advances in our field pointed out and it gave us a bird's eye view of what the future may hold for technicians.

At the January meeting, Mrs. Una Harding, who spent some six years as a nurse on an ocean liner, told us of her life and experiences in a paper entitled "Life at Sea."

The annual elections were held, the new officers being:

President: MISS ALICE GRAY
Vice-President: MR. A. LAWRENCE
Secretary: MISS MARY HALLAM

NEW BRUNSWICK SOCIETY OF X-RAY TECHNICIANS

There was an excellent turn-out of members of the Southern Section of the New Brunswick Society of X-Ray Technicians to the November meeting, held at the County Hospital, East Saint John. After a short business session, Dr. Lachlan Macpherson gave a very splendid address on "Diseases of the Chest," illustrating his talk with radiographs. Dr. Macpherson has honored our Society on different occasions by giving of his valuable time and increased knowledge in speaking to us and we appreciate this very much.

Mr. Irving P. Bird of Fredericton was present at our November meeting.

Miss Marjorie P. MacNabb, our Secretary-Treasurer, has relinquished her duties in that capacity for an indefinite time. We are very grateful to Sister Rose Agnes of St. Joseph's Hospital for so kindly taking up the duties of Secretary-Treasurer.

NOVA SCOTIA SOCIETY OF RADIOGRAPHERS

We do regret that more time in the latter part of the Autumn was not given to technical meetings. Excuses are the easiest things to make, also an easy way out, so I am not going to offer any.

Your executive have met several times, dealing with, and disposing of Dominion and local business, which has been quite heavy. With this dealt with, our field is cleared for technical activities.

It was decided to carry on meetings as last year, meeting every third Wednesday in the month, commencing January 17th, February 21st, March 21st, April 1st, and our Annual General

Meeting May 16th. Topics and speakers for these meetings are not available at present.

We are very sorry to hear that Sister M. Evaristus has been compelled to retire from x-ray work for an indefinite period. Her duties as Sub-Editor for Cape Breton have been taken over by Miss Claire MacGratton. Sister Evaristus is now residing at the Mother House of the Sisters of St. Martha, Antigonish, N.S.

SISTER MARY DAVID,
President.

ONTARIO SOCIETY OF RADIOGRAPHERS

CENTRAL SECTION

The first meeting of the 1944-45 season was held at the Mountain Sanitarium in Hamilton on Nov. 18th. Forty-two hardy people, Hamiltonians, strongly supporting their home meeting, met at 8.30 for a very interesting evening.

Mr. Walter Roberts introduced our guest speaker, Dr. Aitchison, whose subject, "X-Ray Angles in T.B.", proved so interesting that the audience kept him overtime. Dr. Aitchison illustrated his lecture very ably with radiographs and pointed out many items which are not realized, I think, in general x-ray work.

Dr. Aitchison stressed the fact that combined forces of clinical evidence, sputum, skin tests and x-rays give a complete picture of the disease, and any single method of diagnosis is not sufficient. He showed early, moderate and advanced stages of T.B. with the progress demonstrated by radiographs. It was encouraging to learn that approximately 85% of the cases were discharged, after a period, as arrested cases.

Mass radiographic surveys now carried on in mines and other industries aid greatly in the early detection of T.B.

Then, by courtesy of the Victor X-Ray Corporation, a film, "Exploring with X-Rays," was shown. The evening terminated with refreshments and a dance.

Our host, Mr. Walter Roberts, merits especial thanks for the trouble he went to in organizing this final item.

WALTER WHITEHOUSE,
Chairman.

EASTERN SECTION

With the kind permission of the Senior Medical Officer, Squadron Leader O. F. Beamish, a meeting of the Eastern Section of the Ontario Society of Radiographers was held at the Station Hospital, Royal Canadian Air Force Station, Trenton, on November 18th, under the chairmanship of Flight Sergeant J. H. Guthrie.

Papers were read by Flight Lieutenant H. B. Murphy, radiologist at the Hospital, Royal Canadian Air Force Station, Trenton; Mr. J. H. Coones of the Peterborough Medical Clinic, Peterborough, and Mr. R. G. Williams, chief technician of the Belleville General Hospital, Belleville. Dr. Murphy's paper on the value of the double dose technique in examination of gall bladder showed the economy of using this method. Mr. Coones gave a paper on

radiographic density. Mr. Williams demonstrated some very interesting films he has taken in the past several years at Belleville General Hospital.

Matron F. M. Oakes was the hostess and members were taken on a tour through the Hospital and were very impressed with the up-to-date x-ray equipment. After the meeting, luncheon was served and members were entertained at the Sergeants' Mess, Royal Canadian Air Force Station, Trenton.

Matron Oakes is one of the first members of our Society. She has just returned from overseas where she was awarded the Associate of the Royal Red Cross by His Majesty the King. The members were very interested, during luncheon, to hear her relate her experiences overseas.

It is hoped that we can have a meeting of this section in the early Spring.

F/S. J. H. GUTHRIE,
Chairman.

Tenth Annual Meeting and Convention

Royal York Hotel, Toronto

May 12th, 1945.

Due to coming events and for this year only, the Annual Meeting and Convention will try to compress all its activities into one day, May 12th, 1945. This will be held at the Royal York Hotel, Toronto. One should not conclude however, that any important features have been eliminated.

It is the intention of the Convention Committee to make the day interesting and enjoyable and to that end it has been decided to enlarge the scope of the Round Table Conference, so that all and any subject may be discussed, technical, social and economic.

It is planned to have with us at that time a representative of the Department of Veteran Affairs who will discuss rehabilitation from the radiographers' point of view. It is suggested that members and student members make a point of bringing to this conference any of their problems that may have been causing some concern. It is not expected that all will be resolved, but we feel sure that timely advice and information will be obtained.

We trust that every member will make an effort to attend the annual business meeting, which will start at 10 a.m., May 12th, as we expect that some very interesting subjects will be brought up for discussion. After the more serious business of the day has been concluded, dinner and entertainment will be provided.

Make arrangements now to attend this year's convention. Don't forget the date: May 12th, 1945. Place: Royal York Hotel, Toronto.

QUEBEC SOCIETY OF X-RAY TECHNICIANS

Plans Being Made for Third Dominion Convention

The Quebec Society of X-Ray Technicians met at the Jewish General Hospital Saturday afternoon, Dec 2nd. The meeting, entirely devoted to business, was called to order by the President, Mr. H. Simkins. Plans for the Dominion Convention were discussed at length and Committees were appointed. These

Committees have plans well under way and we are hoping to sponsor the most successful Convention yet held.

The Dates Have Definitely Been Set — May 31, June 1 and 2

One of the finest hotels in Montreal, The Windsor, has been selected as Convention Headquarters. Located at the corner of Windsor and Dorchester Streets in the downtown area the Windsor is ideally situated and well equipped to handle all of our needs.

The following Committees have been appointed:

General Chairman
MR. H. SIMKINS
Royal Victoria Hospital, Montreal

Business Committee
(Chairman)
MISS E. MacDONALD
Royal Victoria Hospital, Montreal
MISS J. J. GAGNE

Programme Committee
(Chairman)
MISS R. O'HAGAN
Montreal General Hospital
SOEUR THERESE LEA

Entertainment Committee
(Chairman)
MR. F. DREISINGER
758 Sherbrooke St. W., Montreal
MISS RUTH LOEB

Housing Committee
SOEUR MARY GERVAIS

The following technicians have recently tried and successfully passed the examinations for active membership:

SOEUR MARIE RIENA
MISS ROSE DUCHARME
MISS VIOLETTE GERMAINE
MISS PAULINE BIRMINGHAM
MISS JEAN HARRIS
MISS JOAN MARKEY

Mr. Frank Dreisinger has resigned from the Montreal Neurological Institute and is now on the staff of Picker X-Ray of Canada as Technical Service Director.

SASKATCHEWAN SOCIETY OF X-RAY TECHNICIANS

The recent convention is still being talked about, and those who attended from Saskatchewan returned home full of new ideas and enthusiasm. All agree it was well worth while.

We regret that our Sub-Editor for The Focal Spot, Mr. P. E. Hunt of Saskatoon, has found it necessary to retire from that position, owing to pressure of other affairs. S. G. Johnston is acting as Sub-Editor pro tem, and all news items and other material should be sent to him at the General Hospital, Moose Jaw.

Three new members are welcomed into our Society:

MISS MARIE STENSON
Saskatoon
MISS FLORENCE LOVERIN
Prince Albert
MRS. EDNA CARRIGAN
Prince Albert

We hope you will enjoy your association with us and gain some inspiration to do better work, with the knowledge that we are all trying to help each other towards this end.

Our Treasurer, Mr. Geo. Derrick, of Saskatoon, has given up x-ray work to go into business for himself. The best of good wishes from all of us and thanks for doing a splendid job. Our new Treasurer, Miss Marie Perron, R.T., of Saskatoon, has taken over and is proving herself an able successor.

Miss H. Moffatt, formerly of Deer Lodge Hospital, Winnipeg, has accepted a position at the Victoria Hospital, Prince Albert, Sask.

S. G. JOHNSTON,
President.

Correspondence

Air-graph letter from
Sgt. H. H. Lewis, D-93900, R.C.A.M.C.,
X-ray Dept., Roman Way Convalescent Hospital, C. A., O/S.
(Member of Quebec Society.)

Received The Focal Spot the other day. I thought I would express my gratitude to you and the Society for so fine an achievement. I thoroughly enjoyed the contents. It was both interesting and informative. It was perused and favourable comments were passed by the M.O.'s who usually drop in this department. Am looking forward to receiving your next issue. As usual the x-ray department is one of the busiest — time virtually flies by. We are all optimistic these days and feel the shores of Canada will be on the horizon . . . in the very near future.

With my best wishes to you and the members of the Society.

From Mr. A. J. Ricciatti, Kirkland Lake, Ont.

I was particularly interested in the article by Mr. Hunt, whose principle I have found through practice works very well for duplication. This idea does not work out for initial films as the question of height is involved. When height rather than width accounts for the increase in weight kv changes are not justified.

On p.165 of his original article under "The Patient", last paragraph, Mr. Hunt mentions height variations and in his supplementary article in this issue (just above Table 2A) he also refers to them. We hope that later on he will be able to tell us more about his handling of these exceptional patients.—Editor.

From Sgt. Sam C. Cox, R-95829,
X-Ray Dept.,
Station Hospital, R.C.A.F. Station,
Yarmouth, N.S.

Two copies of The Focal Spot have recently come to my notice, which I have carefully perused and found exceptionally fine in their make-up. I was especially interested in noting the biographies of some of the Society's Life Members, including that of Mr. E. S. Hoare, whose name I well remember in the early days of radiology. My father, the late Harry Cox, happened to be the pioneer manufacturer of x-ray apparatus in Great Britain from 1896, and the source of supply of the first x-ray units ever put into operation by any of the armed forces at the time of the South African War in 1899. During my own forty-one years of continuous service as an x-ray technician in Great Britain, Continental Europe, Canada and the U.S.A., many radical changes and advances have been made. During the last war I was an x-ray technician in various base hospitals of the C.A.M.C., in England and France and on my return to Canada was for several years technician at Brant Military Hospital. Then followed a period as travelling x-ray technician with the Ontario Department of Health and fourteen years at the Pembroke Cottage Hospital. Then back to England and at the outbreak of the present war I was employed in an x-ray capacity in St. Louis, Mo. I returned to Canada hoping that my services would be useful, but was told I was "too old." However in 1941 I was accepted as an x-ray technician by the R.C.A.F., in which capacity I have served in various parts of Canada—Trenton, Hagersville, Carberry, Man., and here at Lachine, Quebec, and am still going strong despite my half-century plus and over forty years x-ray service.

Back in 1930, following attendance at the Convention of the American Society of X-Ray Technicians at Rochester, N.Y., at which meeting your present President, Mr. C. J. Bodle was elected President-Elect of the American Society, I met two other Canadians, Miss Sadie Storm of Welland, Ont., and Mr. J. H. Coones of Peterborough.

We returned to Canada with the intention of organizing in Ontario a group of technical workers along the same lines as the Western Society in Manitoba and Saskatchewan. The Province was divided into three sections — Western, Central and Eastern. I was delegated to contact all x-ray workers in the Eastern section. Letters were sent to x-ray technicians in this section and finally a meeting was held in Ottawa, which had but a scant attendance. However this was the seed from which in 1936, six years later, sprang the Ontario Society. Then I went to Britain and on my return went to the U.S.A., so lost contact with Canadian x-ray activities. Just prior to my departure, however, I was for a short period in London, Ontario, and managed to round up a fair number of technicians in the Western section, which had become dormant, and two very successful meetings were held, with Miss Isabel Clark as Secretary and myself Chairman pro tem.

On looking through The Focal Spot I was particularly interested in the list of technicians now on active service, many of whom I knew well, especially those from Ontario: May Chittim, now married, I believe; Guthrie, Miss Pepper, Roots, Miss Froats, McVicar, Clarke and Tommy Hurst, whom I have known since 1912. So when I gaze at this list I feel something of an outcast, although actually truly a "veteran" both in Active Service life and in the field of radiography. I fear that this letter, which started as a comment on the magazine, has become more of an autobiography, but it is difficult to avoid reminiscing once one gets started.

If you need more information or have something to add to the statements in an article, write to the Editor. We would like to develop a lively correspondence column, but it cannot be done without correspondents.

Secondary Radiation

Radiological Staffitis

By Peggy Quint, Calgary, Alberta

* This item was put on as a skit by three Alberta members at the 1943 Annual Dinner of the Alberta Society.

Chorus

We're a famous trio,
Household words are we,
Radiologist;
Technician;
And the Patient — that's me!

Doctor

Life's a bowl of cherries,
At least that's what they say;
But listen to my story,
Then look at me to-day.

Chorus

Oh, pity the Doctor,
Let's all rant and rate,
The poor old fellow's
In lamentable state.

Doctor

I worked all through school,
I struggled through college,
I strove and I strove
To accumulate knowledge.

My friends said "You're crazy!
We do sympathize.
Why not take it easy
And just Specialize?"

Chorus

Sure! Take it easy ---
Practise x-ray, relax;
With all that swell equipment
You'll have no Income Tax.

Doctor

So I studied Radiology
And I struggled on some more,
And one happy morning
Hung my sign outside the door.

Chorus

It was lovely! Just lovely!
At least so we thought,
But now it appears
It wasn't so hot.

Doctor

From that day to this
It's a well-known fact,
I've seen nothing but miles
Of intestinal tract.

For an appendix I've probed
'Neath a small fluoroscope;
I'll be out of the dark
Some day, I hope.

I have trouble with patients
And referring physicians,
And twice as much more
With my load of technicians.

I'm fast getting grey,
My nerves are all shot,
There are bags 'neath my eyes
And I've developed a "pot."

I'm overworked, overburdened
And with tears in my eyes,
I beg you, just look at me
And DON'T specialize.

Chorus

We're sorry, dear Doctor,
And sad as can be - -

Technician

But your life of trouble
Has nothing on me . . .

I work and I worry
From morning till night
And nothing I do
Ever seems to be right.

I see people and people
And people galore;
I take pictures — a thousand,
A million or more.

I do it with grace
And smiles very sunny,
I must like the job
'Cause it can't be the money!

And what do I get
For these efforts of mine?
Do you tell me I'm swell
And doing just fine?

No! You scowl and you sulk
'Cause a number is missing,
And at films overdark
You go around hissing.

You sputter and stammer,
As mad as can be,
When you request an os calcis
And I give you a knee.

Chorus

Oh! what is the matter?
Is there truth in the rumour
That Doctors, God bless 'em,
Have no sense of humour?

Technician

When I take a pelvis
For a dorsal spine region,
Your remarks on the error
Are apt to be legion.

When Bucky lines show,
Is it really so bad?
I at least got a picture,
You ought to be glad.

And what if I do
Sometimes let patients go
When you wanted more pictures.
Well . . . How could I know?

Life's a bowl of choke cherries
I try and try and try,
And I guess I'll still be trying
When I finally curl up and die.

Chorus

Don't be sad, don't be sorry,
Don't shed a tear or cry,
We like you and we need you,
So you musn't up and die!

Patient

You sure have your worries,
But before you go away,
Listen half a minute
To what I have to say:

Chorus

List! Listen! Everyone!
He wants us all to hear.
Let's give consideration,
And politely lend an ear.

Patient

Mine's a sorry story;
It sure was hard to take,
All the things they did to me
When I had my stomach ache.

I interviewed the Doctor
Who called for the technician —
I would have left them then and there
Had I known of my position.

In my innocence I went,
Never once suspecting
That there was more than met the eye
In this business of detecting.

They took my name, my age, my clothes
And threw me on a table,
And then turned out all the lights
And slid things down a cable.

They poked and pushed and poked some more,
Then handed me a pail
And someone said "Drink all of this —
The last drop, without fail."

I drank and drank and drank and drank,
Till my innards were distended;
I've never been so full before,
'Least not that I've remembered.

By gosh! When they were finished,
I thought that I was through,
But they said "Go 'way, don't eat or drink,
And come back to us at two!"

I left — and starved for hours on end,
A sorry sight to see,
And weak and empty staggered back
For the rest of my G.I.T.

Chorus

He was weak and empty, poor, poor thing!
How sorry we all feel!
But you'd never know from our faces
That our sympathy is real.

Patient

Oh! There I was quite helpless,
Face down beneath a cone;
The nurse came in, pulled off my pants,
And I wished I'd stayed at home.

She said to me "Don't move or breathe"
Rang a bell and went away,
And if I hadn't sneaked a breath,
I'd sure be dead to-day.

Oh! Life's a bowl of barium!
Believe me, kids, I've said it,
The patient does the suffering
But the doctor gets the credit.

Chorus

So pity the Doctor!
And pity the nurse!
But weep for the patient --
His trials are the worse!

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P-B DIAPHRAGM	8:1 grid	FIXATION	15 min.

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